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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XF119

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Site Characterization Surveys off the Coast of New York

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an Incidental Harassment Authorization.

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued an incidental harassment authorization (IHA) to Deepwater Wind, LLC, (DWW) to incidentally harass, by Level B harassment only, marine mammals during high-resolution geophysical (HRG) and geotechnical survey investigations associated with marine site characterization activities off the coast of New York in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS-A 0486) (Lease Area) and along potential submarine cable routes to a landfall location in Easthampton, New York ("Submarine Cable Corridor") (collectively the Lease Area and Submarine Cable Corridor are the Project Area).

DATES: This Authorization is effective from June 16, 2017 through June 15, 2018.

FOR FURTHER INFORMATION CONTACT: Laura McCue, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the applications and supporting documents, as well as a list of the references cited in this document, may be obtained by visiting

the Internet at: www.nmfs.noaa.gov/pr/permits/incidental/energy_other.htm. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

NMFS has defined “negligible impact” in 50 CFR 216.103 as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, we adversely affect the species or stock through effects on annual rates of recruitment or survival.

The MMPA states that the term “take” means to harass, hunt, capture, kill or attempt to harass, hunt, capture, or kill any marine mammal.

Except with respect to certain activities not pertinent here, the MMPA defines “harassment” as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the

potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. §§ 4321 *et seq.*) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action (*i.e.*, the issuance of an incidental harassment authorization) with respect to potential impacts on the human environment. Accordingly, NMFS prepared an Environmental Assessment (EA) to consider the environmental impacts associated with the issuance of the IHA.

NMFS' EA will be made available at www.nmfs.noaa.gov/pr/permits/incidental/other_energy.htm at the time of the publication of this *Federal Register* notice.

Summary of Request

On December 1, 2016, NMFS received application request from DWW for an IHA to take marine mammals incidental to 2017 geophysical survey investigations in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS) lease area #OCS-A-0486 Lease Area and along potential submarine cable routes to a landfall location in Easthampton, New York (Project Area) designated and offered by the U.S. Bureau of Ocean Energy Management (BOEM), to support the development of an offshore wind project. DWW's request was for take of 18 species of marine mammals by Level B harassment of a small number of 18 species and take by Level A harassment of 3 species. Neither DWW nor NMFS expects mortality to result from this activity; and therefore, an

IHA is appropriate. NMFS determined that the application was adequate and complete on April 27, 2017.

Description of the Specified Activity

Overview

DWW plans to conduct a geophysical and geotechnical survey in the Project Area to support the characterization of the existing seabed and subsurface geological conditions in the Project Area. Surveys will include the use of the following equipment: shallow and medium-penetration sub-bottom profiler (chirper, boomer, and sparker) used during the HRG survey, multi-beam depth sounder, side-scan sonar, vibracores, and cone penetration tests (CPTs). The planned geophysical survey activities would occur for 168 days beginning in June 2017, and geotechnical survey activities would take place in June 2017 and last for approximately 75 days. Take, by Level B Harassment only of individuals of 18 species of marine mammals is anticipated to result from the specified activities. No serious injury or mortality is expected from DWW's HRG and geotechnical surveys. A detailed description of the planned marine site characterization project is provided in the *Federal Register* notice for the proposed IHA (82 FR 22250; May 12, 2017). Since that time, no changes have been made to the planned marine site characterization survey activities. Therefore, a detailed description is not provided here. Please refer to that *Federal Register* notice for the description of the specific activity.

Comments and Responses

A notice of NMFS's proposal to issue an IHA to DWW was published in the *Federal Register* on May 12, 2017 (80 FR 22250). That notice described, in detail, DWW's activity, the marine mammal species that may be affected by the activity and the anticipated effects on marine mammals. During the 30-day public comment period, NMFS received comments from

the Marine Mammal Commission (Commission) and one private citizen. Only the Commission had substantive comments.

Comment 1: The Commission noted a discrepancy between the source levels used in this project and the a recently issued IHA for another marine site characterization project (82 FR 20577) to Ocean Wind, LLC (Ocean Wind) and recommended that NMFS (1) explain why the sparker source levels for the two projects were considerably different, (2) encourage applicants to disclose the methods used in measuring and calculating source levels of the various sound sources, and (3) ensure accuracy and consistency in source levels used by applicants for different projects with similar types of HRG equipment.

Response: NMFS was provided with proprietary information from Ocean Wind and was unable to use that data in the analysis for DWW. The source levels that were used for this project were described in the notice of our proposed IHA (82 FR 22250; May 12, 2017) but included source levels from the manufacturer and from measurements taken in situ (Crocker and Fratantonio 2016). In the future, we will encourage applicants to disclose their data to the public and will continue to use all publicly available data to ensure consistency and accuracy for similar projects.

Comment 2: The Commission does not believe that take by Level A harassment would likely occur from project activities because of the very small Level A zones (*e.g.* 5.12 m for harbor porpoise and 0.65 m for harbor seals and gray seals) and the increased likelihood that take by Level A harassment could be avoided with the implementation of the minimum 200 meter (m) shutdown zone. The Commission recommends that NMFS use a consistent approach for authorizing Level A harassment takes, especially in situations when mitigation measure implementation very likely would preclude taking in the respective Level A harassment zones

Response: NMFS agrees with the Commission and believes that all modeled take by Level A harassment could be avoided with the implementation of the shutdown zones. We have removed the authorization for Level A take for harbor porpoise, harbor seals, and gray seals.

Comment 3: The Commission recommends that, until the behavior thresholds are updated, NMFS require applicants to use the 120- rather than 160-decibel (dB) re 1 micropascal (μ Pa) threshold for acoustic, non-impulsive sources (*e.g.*, chirp-type sub-bottom profilers, echosounders, and other sonars including side-scan and fish-finding).

Response: NMFS considers sub-bottom profilers to be impulsive sources; therefore, 160 dB threshold will continue to be used. Additionally, BOEM listed sparkers as impulsive sources (BOEM 2016). The 120-dB threshold is typically associated with continuous sources. Continuous sounds are those whose sound pressure level remains above that of the ambient sound, with negligibly small fluctuations in level (NIOSH, 1998; ANSI, 2005). Intermittent sounds are defined as sounds with interrupted levels of low or no sound (NIOSH, 1998). Sub-bottom profiler signals are intermittent sounds. Intermittent sounds can further be defined as either impulsive or non-impulsive. Impulsive sounds have been defined as sounds which are typically transient, brief (<1 sec), broadband, and consist of a high peak pressure with rapid rise time and rapid decay (ANSI, 1986; NIOSH, 1998). Non-impulsive sounds typically have more gradual rise times and longer decays (ANSI, 1995; NIOSH, 1998). Sub-bottom profiler signals have durations that are typically very brief (<1 sec), with temporal characteristics that more closely resemble those of impulsive sounds than non-impulsive sounds. With regard to behavioral thresholds, we consider the temporal and spectral characteristics of sub-bottom profiler signals to more closely resemble those of an impulse sound rather than a continuous sound. The 160-dB threshold is typically associated with impulsive sources. Therefore, the 160-

dB threshold (typically associated with impulsive sources) is more appropriate than the 120-dB threshold (typically associated with continuous sources) for estimating takes by behavioral harassment incidental to use of such sources.

Comment 4: The Commission recommends that NMFS require DWW to monitor the full extent of the Level B harassment zones for the purpose of enumerating Level B harassment takes and documenting any behavioral responses observed.

Response: The Level B zones extend to 3,556 m for vibracore, 893 m for sparkers, and 500 m for dynamic positioning (DP) thrusters. It is not practicable for the applicant to monitor these zones. Therefore, NMFS is clarifying that the monitoring measures include Protected Species Observers (PSO)s will monitor all visible waters to the extent practicable so as to not undermine effectiveness of shutdown zone. The data collection and reporting requirements will include providing an estimate of the observable distance recorded at each shift change; and, if the entire Level B zone was not able to be monitored, DWW apply a correction to the observed marine mammals in the 160 dB zone to estimate the number of animals that were likely not detected based on the area that was not monitored.

Description of Marine Mammals in the Area of the Specified Activity

There are 36 species of marine mammals that potentially occur in the Northwest Atlantic OCS region (BOEM, 2014) (Table 1). The majority of these species are pelagic and/or northern species, or are so rarely sighted that their presence in the Project Area is unlikely. Eighteen of these species are included in the take estimate for this project based on seasonal density in the Project area. The other 18 species are not included in the take request because they have low densities in the Project area, are rarely sighted there, and are considered very unlikely to occur in the area.

Further information on the biology, ecology, abundance, and distribution of those species likely to occur in the Project Area can be found in section 4 of DWW's application, and the NMFS Marine Mammal Stock Assessment Reports (see Waring *et al.*, 2016), which are available online at: <http://www.nmfs.noaa.gov/pr/species/>. A detailed description of the of the species likely to be affected by the marine site characterization project, including brief introductions to the species and relevant stocks as well as available information regarding population trends and threats, and information regarding local occurrence, were provided in the *Federal Register* notice for the proposed IHA (82 FR 22250; May 12, 2017). Since that time, we are not aware of any changes in the status of these species and stocks; therefore, detailed descriptions are not provided here. Please refer to that *Federal Register* notice for these descriptions. Please also refer to NMFS' website (www.nmfs.noaa.gov/pr/species/mammals/) for generalized species accounts.

Table 1. Marine Mammals Known to Occur in the Waters off the Northwest Atlantic OCS.

Common Name	Stock	NMFS MMPA and ESA Status; Strategic (Y/N) ¹	Stock Abundance (CV,Nmin, most recent abundance survey) ²	PBR ³	Occurrence and seasonality in the NW Atlantic OCS
Toothed whale (Odontoceti)					
Atlantic white-sided dolphin (<i>Lagenorhynchus acutus</i>)	W. North Atlantic	--; N	48,819 (0.61; 30,403; n/a)	304	rare
Atlantic spotted dolphin (<i>Stenella frontalis</i>)	W. North Atlantic	--; N	44,715 (0.43; 31,610; n/a)	316	rare
Bottlenose dolphin (<i>Tursiops truncatus</i>)	W. North Atlantic, Offshore	--; N	77,532 (0.40; 56,053; 2011)	561	Common year round
Clymene Dolphin (<i>Stenella clymene</i>)	W. North Atlantic	--; N	Unknown (unk; unk; n/a)	Undet	rare
Pantropical Spotted Dolphin (<i>Stenella attenuata</i>)	W. North Atlantic	--; N	3,333 (0.91; 1,733; n/a)	17	rare
Risso's dolphin (<i>Grampus griseus</i>)	W. North Atlantic	--; N	18,250 (0.46; 12,619; n/a)	126	rare
Short-beaked common dolphin (<i>Delphinus delphis</i>)	W. North Atlantic	--; N	70,184 (0.28; 55,690; 2011)	557	Common year round
Striped dolphin (<i>Stenella coeruleoalba</i>)	W. North Atlantic	--; N	54,807 (0.3; 42,804; n/a)	428	rare

Spinner Dolphin (<i>Stenella longirostris</i>)	W. North Atlantic	--; N	Unknown (unk; unk; n/a)	Undet	rare
White-beaked dolphin (<i>Lagenorhynchus albirostris</i>)	W. North Atlantic	--; N	2,003 (0.94; 1,023; n/a)	10	rare
Harbor porpoise (<i>Phocoena phocoena</i>)	Gulf of Maine/Bay of Fundy	--; N	79,833 (0.32; 61,415; 2011)	706	Common year round
Killer whale (<i>Orcinus orca</i>)	W. North Atlantic	--; N	Unknown (unk; unk; n/a)	Undet	rare
False killer whale (<i>Pseudorca crassidens</i>)	W. North Atlantic	--; Y	442 (1.06; 212; n/a)	2.1	rare
Long-finned pilot whale (<i>Globicephala melas</i>)	W. North Atlantic	--; Y	5,636 (0.63; 3,464; n/a)	35	rare
Short-finned pilot whale (<i>Globicephala macrorhynchus</i>)	W. North Atlantic	--; Y	21,515 (0.37; 15,913; n/a)	159	rare
Sperm whale (<i>Physeter macrocephalus</i>)	North Atlantic	E; Y	2,288 (0.28; 1,815; n/a)	3.6	Year round in continental shelf and slope waters, occur seasonally to forage
Pygmy sperm whale (<i>Kogia breviceps</i>)	W. North Atlantic	--; N	3,785 ^{b/} (0.47; 2,598; n/a)	26	rare
Dwarf sperm whale (<i>Kogia sima</i>)	W. North Atlantic	--; N	3,785 ^{b/} (0.47; 2,598; n/a)	26	rare
Cuvier's beaked whale (<i>Ziphius cavirostris</i>)	W. North Atlantic	--; N	6,532 (0.32; 5,021; n/a)	50	rare
Blainville's beaked whale (<i>Mesoplodon densirostris</i>)	W. North Atlantic	--; N	7,092 ^{c/} (0.54; 4,632; n/a)	46	rare
Gervais' beaked whale (<i>Mesoplodon europaeus</i>)	W. North Atlantic	--; N	7,092 ^{c/} (0.54; 4,632; n/a)	46	rare
True's beaked whale (<i>Mesoplodon mirus</i>)	W. North Atlantic	--; N	7,092 ^{c/} (0.54; 4,632; n/a)	46	rare
Sowerby's Beaked Whale (<i>Mesoplodon bidens</i>)	W. North Atlantic	--; N	7,092 ^{c/} (0.54; 4,632; n/a)	46	rare
Melon-headed whale (<i>Peponocephala electra</i>)	W. North Atlantic	--; N	Unknown (unk; unk; n/a)	Undet	rare
Baleen whales (Mysticeti)					
Minke whale (<i>Balaenoptera acutorostrata</i>)	Canadian East Coast	--; N	2,591 (0.81; 1,425; n/a)	162	Year round in continental shelf and slope waters, occur seasonally to forage
Blue whale (<i>Balaenoptera musculus</i>)	W. North Atlantic	E; Y	Unknown (unk; 440; n/a)	0.9	Year round in continental shelf and slope waters, occur seasonally to forage
Fin whale (<i>Balaenoptera physalus</i>)	W. North Atlantic	E; Y	1,618 (0.33; 1,234; n/a)	2.5	Year round in continental shelf and slope waters, occur seasonally to forage
Humpback whale (<i>Megaptera novaeangliae</i>)	Gulf of Maine	--; N	823 (0; 823; n/a)	2.7	Common year round
North Atlantic right whale (<i>Eubalaena glacialis</i>)	W. North Atlantic	E; Y	440 (0; 440; n/a)	1	Year round in continental shelf and slope waters, occur seasonally to forage.
Sei whale (<i>Balaenoptera borealis</i>)	Nova Scotia	E; Y	357 (0.52; 236; n/a)	0.5	Year round in continental shelf and slope waters, occur seasonally to forage
Earless seals (Phocidae)					
Gray seals	North Atlantic	--; N	505,000 (unk; unk;	Undet	Unlikely

<i>(Halichoerus grypus)</i>			n/a)		
Harbor seals <i>(Phoca vitulina)</i>	W. North Atlantic	--; N	75,834 (0.15; 66,884; 2012)	2,006	Common year round
Hooded seals <i>(Cystophora cristata)</i>	W. North Atlantic	--; N	Unknown (unk; unk; n/a)	Undet	rare
Harp seal <i>(Phoca groenlandica)</i>	North Atlantic	--; N	Unknown (unk; unk; n/a)	Undet	rare

¹ESA status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR (see footnote 3) or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

²CV is coefficient of variation; N_{\min} is the minimum estimate of stock abundance. In some cases, CV is not applicable. For certain stocks, abundance estimates are actual counts of animals and there is no associated CV. The most recent abundance survey that is reflected in the abundance estimate is presented; there may be more recent surveys that have not yet been incorporated into the estimate. All values presented here are from the 2016 draft Atlantic SARs.

³Potential biological removal, defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population size (OSP).

Potential Effects of the Specified Activity on Marine Mammals and Their Habitat

The effects of underwater noise from HRG and geotechnical activities for the marine site characterization project have the potential to result in behavioral harassment of marine mammals in the vicinity of the action area. The *Federal Register* notice for the proposed IHA (82 FR 22250; May 12, 2017) included a discussion of the effects of anthropogenic noise on marine mammals. That information is not repeated here. Please refer to that *Federal Register* notice for that information.

Estimated Take by Incidental Harassment

This section provides the number of incidental takes authorized through this IHA, which informed both NMFS' consideration of whether the number of takes is "small" and the negligible impact determination.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of

pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes would be by Level B harassment, in the form of disruption of behavioral patterns resulting from exposure to HRG and geotechnical surveys. The proposed mitigation and monitoring measures (when considered in combination with the operational parameters and characteristics of the sound sources) are expected to alleviate the potential for Level A take of all species. In addition, as described previously, no mortality is anticipated or proposed to be authorized for this activity. Below we describe how the take is estimated.

In summary, we estimate take by considering: 1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; 2) the area or volume of water that will be ensonified above these levels in a day; 3) the density or occurrence of marine mammals within these ensonified areas; and, 4) and the number of days of activities. Below, we describe these components in more detail and present the proposed take estimate.

Acoustic Thresholds

Using the best available science, NMFS has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur permanent threshold shift (PTS) of some degree (equated to Level A harassment).

Level B Harassment for non-explosive sources – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.*, 2007, Ellison *et al.*, 2011). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 μ Pa ((root mean square (rms))) for continuous (*e.g.* vibratory pile-driving, drilling) and above 160 dB re 1 μ Pa (rms) for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources.

DWW's planned activity includes the use of continuous (vibracore and DP thruster) and impulsive (*e.g.* sparkers) sources; and therefore, the 120 and 160 dB re 1 μ Pa (rms) are applicable.

Level A harassment for non-explosive sources - NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Technical Guidance, 2016) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). DWW's marine site characterization activities include the use of impulsive (sparkers) and non-impulsive (vibracore and DP thruster) sources.

These thresholds were developed by compiling and synthesizing the best available science and soliciting input multiple times from both the public and peer reviewers to inform the final product, and are provided in Table 2 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2016 Technical Guidance, which may be accessed at: <http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm>.

Table 2. Summary of PTS Onset Acoustic Thresholds.¹

Hearing Group	PTS Onset Acoustic Thresholds* (Received Level)	
	Impulsive	Non-impulsive
Low-frequency cetaceans	<i>Cell 1</i> Lpk,flat: 219 dB LE,LF,24h: 183 dB	<i>Cell 2</i> LE,LF,24h: 199 dB
Mid-frequency cetaceans	<i>Cell 3</i> Lpk,flat: 230 dB LE,MF,24h: 185 dB	<i>Cell 4</i> LE,MF,24h: 198 dB
High-frequency cetaceans	<i>Cell 5</i> Lpk,flat: 202 dB LE,HF,24h: 155 dB	<i>Cell 6</i> LE,HF,24h: 173 dB
Phocid Pinnipeds (underwaters)	<i>Cell 7</i> Lpk,flat: 218 dB LE,PW,24h: 185 dB	<i>Cell 8</i> LE,PW,24h: 201 dB
Otariid Pinnipeds (underwater)	<i>Cell 9</i> Lpk,flat: 232 dB LE,OW,24h: 203 dB	<i>Cell 10</i> LE,OW,24h: 219 dB

¹NMFS 2016

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that will feed into identifying the area ensonified above the acoustic thresholds.

DWW took into consideration sound sources using the potential operational parameters, bathymetry, geoacoustic properties of the Project Area, time of year, and marine mammal hearing ranges. Results of a sound source verification study in a nearby location showed that estimated maximum distance to the 160 dB re 1 μ Pa (rms) MMPA threshold for all water depths

for the HRG survey sub-bottom profilers (the HRG survey equipment with the greatest potential for effect on marine mammal) was approximately 447 m from the source, which equated to a propagation loss coefficient of $20\log R$ (equivalent to spherical spreading). The estimated maximum critical distance to the 120 dB re 1 μPa (rms) MMPA threshold for all water depths for the vibracore was approximately 1,778 from the source using spherical spreading. For sparkers and vibracore, we doubled these distances to conservatively account for the uncertainty in predicting propagation loss in a similar but different location. The estimated maximum critical distance to the 120 dB re 1 μPa (rms) MMPA threshold for all water depths for the drill ship DP thruster was approximately 500 m from the source based on hydroacoustic modeling results (Subacoustech 2016). DWW and NMFS believe that these estimates represent a conservative scenario and that the actual distances to the Level B harassment threshold may be shorter, as the calculated distance was doubled for the sparker system and vibracore, the SL for the sparker system was conservatively based on a source that was louder than the equipment planned for use in this project, and there are some sound measurements taken in the Northeast that suggest a higher spreading coefficient (which would result in a shorter distance) may be applicable.

The Zone of influence (ZOI) is the extent of the ensonified zone in a given day. The ZOI was calculated using the following equations:

- Stationary source (*e.g.* DP thruster and vibracore): πr^2
- Mobile source (*e.g.* sparkers): $(\text{distance/day} * 2r) + \pi r^2$

Where distance is the maximum survey trackline per day (110 kilometer (km)) and r is the distance to the 160 dB (for impulsive sources) and 120 dB (for non-impulsive sources) isopleths. The isopleths for sparkers and vibracores were calculated using $20\log R$, and the resulting isopleths were doubled as a conservative mechanism to allow for any uncertainty in

propagation loss. The isopleths for the DP thruster was calculated using a transmission loss coefficient of 11.12, which was based on field verification study results (Subacoustech 2016).

Table 3. User Spreadsheet Input.

	Vibracore	DP Thruster	Sparker
Spreadsheet Tab Used	A) Non-impulsive-Stat-Cont	A) Non-impulsive-Stat-Cont	F) Impulsive-Mobile
Source Level	185 dB RMS	150 dB RMS	186 dB SEL
Weighting Factor Adjustment	1.7, 6.2, 20	1.75, 5	2.75, 1.2
Activity Duration (hours) within 24-h period	1	1, 3	n/a
Propagation (xLogR)	20	11.12	n/a
Distance of source level measurement (meters)	1	1	n/a
Source velocity (meters/second)	n/a	n/a	1.93
1/Repetition rate (seconds)	n/a	n/a	2.48

DWW used the user spreadsheet to calculate the isopleth for the loudest sources (sparker, vibracore, DP thruster). The sparker was calculated with the following conditions: source level of 186 dB SEL, source velocity of 1.93 meters per second (m/s), repetition rate of 2.48, and a weighting factor adjustment of 1.2 and 2.75 based on the appropriate broadband source. Isopleths were less than 1 m for all hearing groups (Table 4) except high-frequency cetaceans, which was 5.12 m. Take by Level A harassment can be avoided with the implementation of the shutdowns during all planned activities. Shutdown zones exceed the Level A zones for sparkers. The vibracore used the following parameters: source level of 185 rms, distance of source level measurement at 1 m, duration of 1 hour, propagation loss of 20, and weighting factor adjustment of 1.7, 6.2, and 20 based on the spectrograms for this equipment. Isopleths are summarized in Table 4 and no Level A takes are requested during the use of the vibracore. The DP thruster was

defined as non-impulsive static continuous source with a source level of 150 dB rms, Propagation loss of 11.12 based on the spectrograms for this equipment (Subacoustech 2016), an activity duration of 1 and 3 hours and weighting factor adjustment of 1.7 and 5. Isopleths were less than 3 m for all hearing groups (Table 4); therefore, no Level A takes were requested for this source.

Table 4. Maximum Worst-Case Distance (m) and Area (km²) to the Level A and Level B Thresholds.

Hearing Group	SELCum Threshold (dB)	Equipment	Vibracore Operations: HPC or Rossfelder Corer			DP Thruster		800 Joule Geo Resources Sparker	Sparker System
		Source PLS	185 dB _{RMS}			150 dB _{RMS}		186 dB _{SEL}	186 dB _{SEL}
Level A									
	Threshold	WFA* (kHz)	1.7	6.2	20	1.7	5	2.75	1.2
Low-Frequency Cetaceans	199	PTS Isopleth to threshold (meters)	11.97 m, 0 km ²			0.06 m, 0 km ²		1.29 m, 0.283 km ²	1.30 m, 0.287 km ²
Mid-Frequency Cetaceans	198				12.96 m, 0.001 km ²		0.03 m, 0 km ²	0.02 m, 0.005 km ²	
High-Frequency Cetaceans	173				207.58 m, 0.135 km ²		2.17 m, 0 km ²	5.12 m, 1.127 km ²	
Phocid Pinnipeds	201			9.51 m, 0 km ²			0.11 m, 0 km ²	0.65 m, 0.144 km ²	
Level B									
All Marine Mammals	Threshold	Source PLS	185 dB _{RMS}			150 dB _{RMS}		213 dB _{RMS}	213 dB _{RMS}
	120	Level B Harassment Distance	3,556 m, 39.74 km ²			499 m, 0.78 km ²			
	160							893 m, 199.0481 km ²	893 m, 199.0481 km ²

*Weighting Factor Adjustment

Marine Mammal Occurrence

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations.

DWW estimated species densities within the planned project area in order to estimate the number of marine mammal exposures to sound levels above the 120 dB Level B harassment threshold for continuous noise (*i.e.*, DP thrusters and vibracore) and the 160 dB Level B harassment threshold for intermittent, impulsive noise (*i.e.*, sparkers). Research indicates that marine mammals generally have extremely fine auditory temporal resolution and can detect each signal separately (*e.g.*, Au *et al.*, 1988; Dolphin *et al.*, 1995; Supin and Popov 1995; Mooney *et al.*, 2009b), especially for species with echolocation capabilities. Therefore, it is likely that marine mammals would perceive the acoustic signals associated with the HRG survey equipment as being intermittent rather than continuous, and we base our takes from these sources on exposures to the 160 dB threshold.

The data used as the basis for estimating cetacean density (“D”) for the Lease Area are sightings per unit effort (SPUE) derived by Duke University (Roberts *et al.*, 2016). For pinnipeds, the only available comprehensive data for seal abundance is the Northeast Navy Operations Area (OPAREA) Density Estimates (DoN 2007). SPUE (or, the relative abundance of species) is derived by using a measure of survey effort and number of individual cetaceans sighted. SPUE allows for comparison between discrete units of time (*i.e.* seasons) and space within a project area (Shoop and Kenney 1992). The Duke University (Roberts *et al.*, 2016) cetacean density data represent models derived from aggregating line-transect surveys conducted over 23 years by 5 institutions (NMFS Northeast Fisheries Science Center (NEFSC), New Jersey Department of Environmental Protection (NJDEP), NMFS Southeast Fisheries Science Center (SEFSC), University of North Carolina Wilmington (UNCW), Virginia Aquarium & Marine Science Center (VAMSC)), the results of which are freely available online at the Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations

(OBIS-SEAMAP) repository. The datasets for each species were downloaded from OBIS-SEAMAP and were modeled as estimated mean year-round abundance (number of individual animals) per grid cell (100 km by 100 km) for most species. For certain species, the model predicted monthly mean abundance rather than mean year-round abundance, for which the annual mean abundance was calculated using Spatial Analyst tools in ArcGIS. Based on the annual mean abundance datasets, the mean density (animals/km²) was calculated in ArcGIS by averaging the abundance of animals within the Project Area and dividing by 100 to get animals/km². The OPAREA Density Estimates (DoN 2007) used for pinniped densities were based on data collected through NMFS NWFSC aerial surveys conducted between 1998 and 2005.

Take Calculation and Estimation

Here we describe how the information provided above is brought together to produce a quantitative take estimate.

Estimated takes were calculated by multiplying the species density (animals per km²) by the appropriate ZOI, multiplied by the number of appropriate days (*e.g.* 168 for HRG activities or 53 days for vibracoring or 22 days for DP thruster during CPT) of the specified activity. A detailed description of the acoustic modeling used to calculate zones of influence is provided in DWW's IHA application (also see the discussion in the *Mitigation Measures* section below).

DWW used a distance to the 160 dB Level B threshold of 447 m, which was doubled to be conservative for any uncertainty in propagation loss, for a maximum distance of 894 m for the sparker system. The ZOI of 199.048 km² for the sparker system and the survey period of a conservative 168 days, which includes estimated weather downtime, was used to estimate take from use of the HRG survey equipment during geophysical survey activities. The ZOI is based

on the worst case (since it assumes the higher powered Dura-Spark 240 System sparker will be operating all the time) and a maximum survey trackline of 110 km (68 mi) per day. The resulting take estimates (rounded to the nearest whole number) are presented in Table 5.

DWW used a maximum distance to the 120 dB Level B threshold of 499 m for DP thrusters. The ZOI of 0.782 km² and the maximum DP thruster use period of 22 days were used to estimate take from use of the DP thruster during geotechnical survey activities.

DWW used a distance to the 120 dB Level B zone of 1,778 m, which was doubled to be conservative, for a maximum distance of 3,556 m for vibracore. The ZOI of 39.738 km² and a maximum vibracore use period of 53 days were used to estimate take from use of the vibracore during geotechnical survey activities. The resulting take estimates (rounded to the nearest whole number) based upon these conservative assumptions are presented in Table 5.

DWW's requested take numbers are provided in Table 5 and are also the number of takes NMFS is authorizing. DWW's calculations do not take into account whether a single animal is harassed multiple times or whether each exposure is a different animal. Therefore, the numbers in Tables 5 are the maximum number of animals that may be harassed during the HRG and geotechnical surveys (*i.e.*, DWW assumes that each exposure event is a different animal). These estimates do not account for prescribed mitigation measures that DWW would implement during the specified activities and the fact that shutdown/powerdown procedures shall be implemented if an animal enters within 200 m of the vessel during any activity and within 400 m when the sparkers are operating, further reducing the potential for any takes to occur during these activities. The take numbers in Table 5 were reduced from the proposed IHA due to a change in the number of days of operation of the vibracore and CPT. In the proposed IHA, we conservatively estimated the maximum number of days of geotechnical activities (75) for each

type of activity. Here we have reduced the total number of days for each source (53 days for vibracore and 22 days of DP thruster use during CPT) since they will not be running on the same day.

When NMFS Technical Guidance (2016) was published, in recognition of the fact that ensonified area/volume could be more technically challenging to predict because of the duration component in the new thresholds, we developed a User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or occurrence to help predict takes. We note that because of some of the assumptions included in the methods used for these tools, we anticipate that isopleths produced are typically going to be overestimates of some degree, which will result in some degree of overestimate of Level A take. However, these tools offer the best way to predict appropriate isopleths when more sophisticated 3D modeling methods are not available, and NMFS continues to develop ways to quantitatively refine these tools, and will qualitatively address the output where appropriate. For mobile sources, the User Spreadsheet predicts the closest distance at which a stationary animal would not incur PTS if the sound source traveled by the animal in a straight line at a constant speed. Inputs used in the User Spreadsheet, and the resulting isopleths are reported in Tables 3 and 4.

Table 5. Authorized Level B Harassment Takes for HRG and Geophysical Survey Activities.

Equipment	Density	HPC or Rossfelder Corer	DP Thruster	Applied Acoustics 100–1,000 joule Dura-Spark 240 System	Total number of takes
Sound Source (dB)		185	150	213 dB _{rms}	
Number of Activity Days		53 ¹	22 ¹	168	
Threshold		RMS 120 dB	RMS 120 dB	RMS 160 dB	
Species Common Name		Level B Take (multiplied by number of days)			
Odontoceti (Toothed Whales and Dolphins)					
Sperm whale	0.00007657	0	0	3	3
False killer whale	0	0	0	3	3

Cuvier's beaked whale	0.00018441	0*	0	6	6*
Long-finned pilot whale	0.00149747	3*	0	50	53*
Atlantic white-sided dolphin	0.01444053	30*	0*	483	513*
White-beaked dolphin	0.00008411	0	0	3	3
Short-beaked common dolphin	0.04027238	85*	1*	1,347	1433*
Atlantic spotted dolphin	0.00006577	0	0	2	2
Striped dolphin	0.00003174	0	0	1	1
Common bottlenose dolphin	0.0115608	24*	0*	387	411*
Harbor Porpoise	0.03340904	70*	1*	1,117	1,188*
Mysticeti (Baleen Whales)					
Fin whale	0.00207529	4*	0	69	73*
Sei whale	0.00008766	0	0	3	3
Minke whale	0.00046292	1*	0	15	16
Humpback whale	0.0014806	3*	0	50	53*
North Atlantic right whale	0.00295075	6*	0	99	105*
Phocids (Seals)					
Harbor seal	0.313166136	660*	5*	10,472	11,137*
Gray seal	0.036336364	77*	1*	1,215	1,293*

1Number of days of geotechnical activities is 75, with a maximum of 53 days of vibracoring and 22 days of DP thruster use during CPT.

*These take numbers were reduced from the proposed IHA due to a change in the number of days of operation of the vibracore and CPT. In the proposed IHA, we conservatively estimated the maximum number of days of geotechnical activities (75) for each type of activity. Here we have reduced the total number of days for each source since they will not be running on the same day.

Mitigation Measures

In order to issue an IHA under Section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and

manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

1) the manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned) the likelihood of effective implementation (probability implemented as planned); and

2) the practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

With NMFS' input during the application process, and as per the BOEM Lease, DWW will implement the following mitigation measures during site characterization surveys utilizing HRG survey equipment and use of the DP thruster and vibracore. The mitigation measures outlined in this section are based on protocols and procedures that have been successfully implemented and resulted in no observed take of marine mammals for similar offshore projects and previously approved by NMFS (ESS 2013; Dominion 2013 and 2014).

Marine Mammal Exclusion Zones

PSOs will monitor the following exclusion/monitoring zones for the presence of marine mammals:

- A 200-m exclusion zone during all geophysical and geotechnical operations.
- A 400-m exclusion zone during the use of sparkers.

These exclusion zones are exclusion zone specified in stipulations of the OCS-A 0486 Lease Agreement.

- A 208-m exclusion zone for harbor porpoise only, during vibracore activities, only.

Visual Monitoring

Visual monitoring of the established exclusion zone(s) s will be performed by qualified and NMFS-approved PSOs, the resumes of whom will be provided to NMFS for review and approval prior to the start of survey activities. Observer qualifications will include direct field experience on a marine mammal observation vessel and/or aerial surveys in the Atlantic Ocean/Gulf of Mexico. An observer team comprising a minimum of four NMFS-approved PSOs and two certified Passive Acoustic Monitoring (PAM) operators (PAM operators will not function as PSOs), operating in shifts, will be stationed aboard the survey vessel. PSOs and PAM operators will work in shifts such that no one monitor will work more than 4 consecutive hours without a 2-hour break or longer than 12 hours during any 24-hour period. Each PSO will monitor 360 degrees of all visible waters to the extent practicable so as to not undermine effectiveness of shutdown zone monitoring..

PSOs will be responsible for visually monitoring and identifying marine mammals approaching or within the established exclusion zone(s) during survey activities. It will be the responsibility of the Lead PSO on duty to communicate the presence of marine mammals as well

as to communicate and enforce the action(s) that are necessary to ensure mitigation and monitoring requirements are implemented as appropriate. PAM operators will communicate detected vocalizations to the Lead PSO on duty, who will then be responsible for implementing the necessary mitigation procedures.

PSOs will be equipped with binoculars and have the ability to estimate distances to marine mammals located in proximity to the vessel and/or exclusion zone using range finders. Reticulated binoculars will also be available to PSOs for use as appropriate based on conditions and visibility to support the siting and monitoring of marine species. During night operations, PAM (see *Passive Acoustic Monitoring* requirements below) and night-vision equipment in combination with infrared technology will be used. Position data will be recorded using hand-held or vessel global positioning system (GPS) units for each sighting.

The PSOs will begin observation of all zone(s) at least 60 minutes prior to ramp-up of HRG survey equipment. Use of noise-producing equipment will not begin until the exclusion zone is clear of all marine mammals for at least 60 minutes, as per the requirements of the BOEM Lease.

If a marine mammal is detected approaching or entering the 200-m or 400-m exclusion zones, the vessel operator would adhere to the shutdown (during HRG survey) or powerdown (during DP thruster use) procedures described below to minimize noise impacts on the animals.

At all times, the vessel operator will maintain a separation distance of 500 m from any sighted North Atlantic right whale as stipulated in the *Vessel Strike Avoidance* procedures described below. These stated requirements will be included in the site-specific training to be provided to the survey team.

Passive Acoustic Monitoring

As per the BOEM Lease, alternative monitoring technologies (*e.g.*, active or passive acoustic monitoring) are required if a Lessee intends to conduct geophysical surveys at night or when visual observation is otherwise impaired. To support 24-hour HRG survey operations, DWW will include PAM as part of the project monitoring during nighttime operations to provide for optimal acquisition of species detections at night.

Given the range of species that could occur in the Project Area, the PAM system will consist of an array of hydrophones with both broadband (sampling mid-range frequencies of 2 kilohertz (kHz) to 200 kHz) and at least one low-frequency hydrophone (sampling range frequencies of 75 Hertz (Hz) to 30 kHz). The PAM operator(s) will monitor the hydrophone signals for detection of marine mammals in real time both aurally (using headphones) and visually (via the monitor screen displays). PAM operators will communicate detections to the Lead PSO on duty who will ensure the implementation of the appropriate mitigation measure.

Vessel Strike Avoidance

DWW will ensure that vessel operators and crew maintain a vigilant watch for cetaceans and pinnipeds and slow down or stop their vessels to avoid striking these species. Survey vessel crew members responsible for navigation duties will receive site-specific training on marine mammal sighting/reporting and vessel strike avoidance measures. Vessel strike avoidance measures will include the following, except under extraordinary circumstances when complying with these requirements would put the safety of the vessel or crew at risk:

- All vessel operators will comply with 10 knots (<18.5 km per hour [km/h]) speed restrictions in any Dynamic Management Area (DMA).
- All survey vessels will maintain a separation distance of 500 m or greater from any sighted North Atlantic right whale.

- If underway, vessels must steer a course away from any sighted North Atlantic right whale at 10 knots (<18.5 km/h) or less until the 500 m minimum separation distance has been established. If a North Atlantic right whale is sighted in a vessel's path, or within 100 m to an underway vessel, the underway vessel must reduce speed and shift the engine to neutral. Engines will not be engaged until the North Atlantic right whale has moved outside of the vessel's path and beyond 100 m. If stationary, the vessel must not engage engines until the North Atlantic right whale has moved beyond 100 m.
- All vessels will maintain a separation distance of 100 m or greater from any sighted non-delphinoid (*i.e.*, mysticetes and sperm whales) cetaceans. If sighted, the vessel underway must reduce speed and shift the engine to neutral and must not engage the engines until the non-delphinoid cetacean has moved outside of the vessel's path and beyond 100 m. If a survey vessel is stationary, the vessel will not engage engines until the non-delphinoid cetacean has moved out of the vessel's path and beyond 100 m.
- All vessels will maintain a separation distance of 50 m or greater from any sighted delphinoid cetacean. Any vessel underway will remain parallel to a sighted delphinoid cetacean's course whenever possible and avoid excessive speed or abrupt changes in direction. Any vessel underway reduces vessel speed to 10 knots or less when pods (including mother/calf pairs) or large assemblages of delphinoid cetaceans are observed. Vessels may not adjust course and speed until the delphinoid cetaceans have moved beyond 50 m and/or abeam (*i.e.*, moving away and at a right angle to the centerline of the vessel) of the underway vessel.
- All vessels will maintain a separation distance of 50 m or greater from any sighted pinniped.

The training program will be provided to NMFS for review and approval prior to the start of surveys. Confirmation of the training and understanding of the requirements will be documented on a training course log sheet. Signing the log sheet will certify that the crew members understand and will comply with the necessary requirements throughout the survey event.

Seasonal Operating Requirements

Between watch shifts, members of the monitoring team will consult the NMFS North Atlantic right whale reporting systems for the presence of North Atlantic right whales throughout survey operations. The planned survey activities will, however, occur outside of the seasonal management area (SMA) located off the coasts of Delaware and New Jersey. The planned survey activities will also occur in June/July and September, which is outside of the seasonal mandatory speed restriction period for this SMA (November 1 through April 30).

Throughout all survey operations, DWW will monitor the NMFS North Atlantic right whale reporting systems for the establishment of a DMA. If NMFS should establish a DMA in the Lease Area under survey, within 24 hours of the establishment of the DMA, DWW will work with NMFS to shut down and/or alter the survey activities to avoid the DMA.

Ramp-Up

As per the BOEM Lease, a ramp-up procedure will be used for HRG survey equipment capable of adjusting energy levels at the start or re-start of HRG survey activities. A ramp-up procedure will be used at the beginning of HRG survey activities in order to provide additional protection to marine mammals near the Project Area by allowing them to vacate the area prior to the commencement of survey equipment use. The ramp-up procedure will not be initiated during daytime, nighttime, or periods of inclement weather if the exclusion zone cannot be adequately

monitored by the PSOs using the appropriate visual technology (*e.g.*, reticulated binoculars, night vision equipment) and/or PAM for a 60-minute period. A ramp-up would begin with the power of the smallest acoustic HRG equipment at its lowest practical power output appropriate for the survey. The power would then be gradually turned up and other acoustic sources added such that the source level would increase in steps not exceeding 6 dB per 5-minute period. If marine mammals are detected within the HRG survey exclusion zone prior to or during the ramp-up, activities will be delayed until the animal(s) has moved outside the monitoring zone and no marine mammals are detected for a period of 60 minutes.

The DP vessel thrusters will be engaged from the time the vessel leaves the dock to support the safe operation of the vessel and crew while conducting geotechnical survey activities and require use as necessary. Therefore, there is no opportunity to engage in a ramp-up procedure.

Shutdown and Powerdown

HRG Survey - The exclusion zone(s) around the noise-producing activities (HRG and geotechnical survey equipment) will be monitored, as previously described, by PSOs and at night by PAM operators for the presence of marine mammals before, during, and after any noise-producing activity. The vessel operator must comply immediately with any call for shutdown by the Lead PSO. Any disagreement should be discussed only after shutdown.

As per the BOEM Lease, if a non-delphinoid (*i.e.*, mysticetes and sperm whales) cetacean is detected at or within the established exclusion zone (200-m exclusion zone during HRG surveys; 400-m exclusion zone during the operation of the sparker), an immediate shutdown of the survey equipment is required. Subsequent restart of the survey equipment must use the ramp-

up procedures described above and may only occur following clearance of the exclusion zone for 60 minutes.

As per the BOEM Lease, if a delphinoid cetacean or pinniped is detected at or within the exclusion zone, the HRG survey equipment (including the sub-bottom profiler) must be powered down to the lowest power output that is technically feasible. Subsequent power up of the survey equipment must use the ramp-up procedures described above and may occur after (1) the exclusion zone is clear of a delphinoid cetacean and/or pinniped for 60 minutes or (2) a determination by the PSO after a minimum of 10 minutes of observation that the delphinoid cetacean or pinniped is approaching the vessel or towed equipment at a speed and vector that indicates voluntary approach to bow-ride or chase towed equipment

If the HRG sound source (including the sub-bottom profiler) shuts down for reasons other than encroachment into the exclusion zone by a marine mammal including but not limited to a mechanical or electronic failure, resulting in the cessation of sound source for a period greater than 20 minutes, a restart for the HRG survey equipment (including the sub-bottom profiler) is required using the full ramp-up procedures and clearance of the exclusion zone of all cetaceans and pinnipeds for 60 minutes. If the pause is less than 20 minutes, the equipment may be restarted as soon as practicable at its operational level as long as visual surveys were continued diligently throughout the silent period and the exclusion zone remained clear of cetaceans and pinnipeds. If the visual surveys were not continued diligently during the pause of 20 minutes or less, a restart of the HRG survey equipment (including the sub-bottom profiler) is required using the full ramp-up procedures and clearance of the exclusion zone for all cetaceans and pinnipeds for 60 minutes.

Geotechnical Survey (DP Thrusters) - During geotechnical survey activities, a constant position over the drill, coring, or CPT site must be maintained to ensure the integrity of the survey equipment. During DP vessel operations if marine mammals enter or approach the established exclusion zone, DWW plans to reduce DP thruster to the maximum extent possible, except under circumstances when ceasing DP thruster use would compromise safety (both human health and environmental) and/or the integrity of the Project. Reducing thruster energy will effectively reduce the potential for exposure of marine mammals to sound energy. Normal use may resume when PSOs report that the monitoring zone has remained clear of marine mammals for a minimum of 60 minutes since last the sighting.

Based on our evaluation of the applicant's planned measures, as well as other measures considered by NMFS, NMFS has determined that the planned mitigation measures provide the means of effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for incidental take authorizations (ITAs) must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring measures prescribed by NMFS should contribute to improved understanding of one or more of the following general goals:

- Occurrence of marine mammal species or stocks in the action area (*e.g.*, presence, abundance, distribution, density).
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas).
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors.
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks.
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat).
- Mitigation and monitoring effectiveness.

DWW submitted marine mammal monitoring and reporting measures as part of the IHA application.

Visual Monitoring - Visual monitoring all visible waters during all HRG and geotechnical surveys will be performed by qualified and NMFS-approved PSOs (see discussion of PSO qualifications and requirements in *Marine Mammal Exclusion Zones* above).

The PSOs will begin observation of the monitoring zone during all HRG survey activities and all geotechnical operations where DP thrusters are employed. Observations of the monitoring zone will continue throughout the survey activity and/or while DP thrusters are in use. PSOs will be responsible for visually monitoring and identifying marine mammals approaching or entering the established monitoring zone during survey activities.

Observations will take place from the highest available vantage point on the survey vessel. General 360-degree scanning will occur during the monitoring periods, and target scanning by the PSO will occur when alerted of a marine mammal presence.

Data on all PSO observations will be recorded based on standard PSO collection requirements. This will include dates and locations of construction operations; time of observation, location and weather; details of the sightings (*e.g.*, species, age classification (if known), numbers, behavior); an estimate of the observable distance recorded at each shift change, and details of any observed “taking” (behavioral disturbances or injury/mortality). If the entire zone was not observable, DWW will provide an adjusted total take number based on the number of animals observed, and the area that was not observed. The data sheet will be provided to both NMFS and BOEM for review and approval prior to the start of survey activities. In addition, prior to initiation of survey work, all crew members will undergo environmental training, a component of which will focus on the procedures for sighting and protection of marine mammals. A briefing will also be conducted between the survey supervisors and crews, the PSOs, and DWW. The purpose of the briefing will be to establish responsibilities of each party, define the chains of command, discuss communication procedures, provide an overview of monitoring purposes, and review operational procedures.

Acoustic Field Verification – As per the requirements of the BOEM Lease, field verification of the exclusion/monitoring zones will be conducted to determine whether the zones correspond accurately to the relevant isopleths and are adequate to minimize impacts to marine mammals. The details of the field verification strategy will be provided in a Field Verification Plan no later than 45 days prior to the commencement of field verification activities.

DWW must conduct field verification of the exclusion zone (the 160 dB isopleth) for HRG survey equipment and the exclusion zone (the 120 dB isopleth) for DP thruster use for all equipment operating below 200 kHz. DWW must take acoustic measurements at a minimum of two reference locations and in a manner that is sufficient to establish source level (peak at 1 meter) and distance to the 160 dB isopleths (the B harassment zones for HRG surveys) and 120 dB isopleth (the Level B harassment zone) for DP thruster use. Sound measurements must be taken at the reference locations at two depths (*i.e.*, a depth at mid-water and a depth at approximately 1 meter (3.28 ft) above the seafloor).

DWW may use the results from its field-verification efforts to request modification of the exclusion/monitoring zones for the HRG or geotechnical surveys. Any new exclusion/monitoring zone radius proposed by DWW must be based on the most conservative measurements (*i.e.*, the largest safety zone configuration) of the target Level A or Level B harassment acoustic threshold zones. The modified zone must be used for all subsequent use of field-verified equipment. DWW must obtain approval from NMFS and BOEM of any new exclusion/monitoring zone before it may be implemented, and the IHA shall be modified accordingly.

Reporting Measures

DWW will provide the following reports as necessary during survey activities:

- The Applicant will contact NMFS and BOEM within 24 hours of the commencement of survey activities and again within 24 hours of the completion of the activity.
- As per the BOEM Lease: Any observed significant behavioral reactions (*e.g.*, animals departing the area) or injury or mortality to any marine mammals must be reported to NMFS and BOEM within 24 hours of observation. Dead or injured protected species are reported to the NMFS Greater Atlantic Regional Fisheries Office (GARFO) Stranding Hotline (800-900-3622) within 24 hours of sighting, regardless of whether the injury is caused by a vessel. In addition, if the injury or death was caused by a collision with a project related vessel, DWW must ensure that NMFS and BOEM are notified of the strike within 24 hours. DWW must use the form included as Appendix A to Addendum C of the Lease to report the sighting or incident. Additional reporting requirements for injured or dead animals are described below (*Notification of Injured or Dead Marine Mammals*).
- *Notification of Injured or Dead Marine Mammals* - In the unanticipated event that the specified HRG and geotechnical activities lead to an injury of a marine mammal (Level A harassment) or mortality (*e.g.*, ship-strike, gear interaction, and/or entanglement), DWW would immediately cease the specified activities and report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources and the NOAA GARFO Stranding Coordinator. The report would include the following information:
 - Time, date, and location (latitude/longitude) of the incident;
 - Name and type of vessel involved;
 - Vessel's speed during and leading up to the incident;
 - Description of the incident;

- Status of all sound source use in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the event. NMFS would work with DWW to minimize reoccurrence of such an event in the future. DWW would not resume activities until notified by NMFS.

In the event that DWW discovers an injured or dead marine mammal and determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.*, in less than a moderate state of decomposition), DWW would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources and the GARFO Stranding Coordinator. The report would include the same information identified in the paragraph above. Activities would be able to continue while NMFS reviews the circumstances of the incident. NMFS would work with DWW to determine if modifications in the activities are appropriate.

In the event that DWW discovers an injured or dead marine mammal and determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.*, previously wounded animal, carcass with moderate to

advanced decomposition, or scavenger damage), DWW would report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, and the GARFO Regional Stranding Coordinator, within 24 hours of the discovery. DWW would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS. DWW can continue its operations under such a case.

- Within 90 days after completion of the marine site characterization survey activities, a technical report will be provided to NMFS and BOEM that fully documents the methods and monitoring protocols, summarizes the data recorded during monitoring, estimates the number of marine mammals that may have been taken during survey activities, and provides an interpretation of the results and effectiveness of all monitoring tasks. Any recommendations made by NMFS must be addressed in the final report prior to acceptance by NMFS.
- In addition to the Applicant's reporting requirements outlined above, DWW will provide an assessment report of the effectiveness of the various mitigation techniques, *i.e.* visual observations during day and night, compared to the PAM detections/operations. This will be submitted as a draft to NMFS and BOEM 30 days after the completion of the HRG and geotechnical surveys and as a final version 60 days after completion of the surveys.

Negligible Impact Analysis and Determinations

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival. A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes, alone, is not enough

information on which to base an impact determination. In addition to considering the authorized number of marine mammals that might be “taken” through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration, etc.), as well as effects on habitat, the status of the affected stocks, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for the NMFS implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into these analyses via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

As discussed in the *Potential Effects* section, PTS, masking, non-auditory physical effects, and vessel strike are not expected to occur. Further, once an area has been surveyed, it is not likely that it will be surveyed again, thereby reducing the likelihood of repeated impacts within the project area.

Potential impacts to marine mammal habitat were discussed previously in this document (see the *Potential Effects of the Specified Activity on Marine Mammals and their Habitat* section). Marine mammal habitat may be impacted by elevated sound levels and some sediment disturbance, but these impacts would be temporary. Also, feeding behavior is less likely to be impacted than other behavioral patterns, as marine mammals appear to be less likely to exhibit behavioral reactions or avoidance responses while engaged in feeding activities (Richardson *et al.*, 1995). Additionally, prey species are mobile and are broadly distributed throughout the

Project Area; therefore, marine mammals that may be temporarily displaced during survey activities are expected to be able to resume foraging once they have moved away from areas with disturbing levels of underwater noise. Because of the temporary nature of the disturbance, and the availability of similar habitat and resources in the surrounding area, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or their populations. Furthermore, there are no rookeries or mating grounds known to be biologically important to marine mammals within the project area. A biologically important feeding area for fin whales East of Montauk Point (from March to October) and a biologically important migratory route effective March-April and November-December for North Atlantic right whale, occur near the Project Area (LaBrecque, *et al.*, 2015). However, there is only a small temporal overlap between the migratory biologically important area (BIA) and the planned survey activities in November and December.

ESA-listed species for which takes are authorized are North Atlantic right, sperm, sei and fin whales. Recent estimates of abundance indicate a potential declining right whale population; however, this may also be due to low sighting rates in areas where right whales were present in previous years, due to a shift in habitat use patterns (Waring *et al.*, 2016). While we are concerned about declining right whale populations, and we are authorizing take of 105 individuals, as described elsewhere in this section the anticipated impacts are expected to be in the form of shorter-term lower level disturbance in areas that are not of particular known importance for right whales, and not expected to have any impacts on health or fitness. There are currently insufficient data to determine population trends for fin whale, sei whale, and sperm whale (Waring *et al.*, 2015). There is no designated critical habitat for any ESA-listed marine mammals within the Project Area, and most of the stocks for non-listed species authorized to be

taken are not considered depleted or strategic by NMFS under the MMPA. Of the two non-listed species that are considered strategic for which take is requested (false killer whale and long-finned pilot whale), take is less than one percent of the entire populations. Therefore, the planned site characterization surveys will not have population-level effects, and we do not expect them to impact annual rates of recruitment or survival.

The mitigation measures are expected to reduce the number and/or severity of takes by (1) giving animals the opportunity to move away from the sound source before HRG survey equipment reaches full energy; (2) reducing the intensity of exposure within a certain distance by reducing the DP thruster power; and (3) preventing animals from being exposed to sound levels that may cause injury. Additional vessel strike avoidance requirements will further mitigate potential impacts to marine mammals during vessel transit to and within the Study Area.

DWW did not request, and NMFS is not authorizing, take of marine mammals by serious injury or mortality. NMFS expects that most takes would be in the form of a very small number of short-term Level B behavioral harassment in the form of brief startling reaction and/or temporary avoidance of the area or decreased foraging (if such activity were occurring)—reactions that are considered to be of low severity and with no lasting biological consequences (*e.g.*, Southall *et al.*, 2007). This is largely due to the short time scale of the planned activities, the low source levels and intermittent nature of many of the technologies planned to be used, as well as the required mitigation.

NMFS concludes that exposures to marine mammal species and stocks due to DWW's HRG and geotechnical survey activities would result in only short-term and relatively infrequent effects to individuals exposed and not of the type or severity that would be expected to be additive for the small portion of the stocks and species likely to be exposed. NMFS does not

anticipate the authorized takes to impact annual rates of recruitment or survival, because although animals may temporarily avoid the immediate area, they are not expected to permanently abandon the area. Additionally, major shifts in habitat use, distribution, or foraging success, are not expected.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the monitoring and mitigation measures, NMFS finds that the total marine mammal take from the planned activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under Section 101(a)(5)(D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of the relevant species or stock size in our determination of whether an authorization is limited to small numbers of marine mammals. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

The takes authorized for the HRG and geotechnical surveys represent less than 1 percent for 11 stocks (sei whale, minke whale, sperm whale, false killer whale, Cuvier's beaked whale, long-finned pilot whale, white-beaked dolphin, Atlantic spotted dolphin, striped dolphin, bottlenose dolphin, and gray seal); 1.05 percent for Atlantic white-sided dolphin; 1.48 percent for harbor porpoise; 2.04 percent for short-beaked common dolphin; 4.51 percent for fin whale; 6.43 percent for humpback whale; and 14.68 percent for harbor seal (Table 6). Just under 24 percent of the North Atlantic right whale stock has take authorized; however, this is for the entire

duration of the project activities (mid-June through December), and while this stock of right whales may be present in very low numbers in the winter months (November and December) in this area, most animals have moved off the feeding grounds and have moved to the breeding grounds during this time. We do not expect a large number of right whales to be in the area for nearly one third of the project duration. Only repeated takes of some individuals are likely and this is an overestimate of the number of individual right whales that may actually be impacted by project activities. However, we analyzed the potential for take of 23.86 percent of the individual right whales in the context of the anticipated effects described previously.

These take estimates represent the percentage of each species or stock that could be taken by Level B harassment and are small numbers relative to the affected species or stock sizes. Further, the take numbers represent the instances of take and are the maximum numbers of individual animals that are expected to be harassed during the project; it is possible that some exposures may occur to the same individual.

Based on the analysis contained herein of the planned activity (including the mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

Table 6. Summary of Marine Mammal Takes and Percentage of Stocks Affected.

Species	Authorized Level B Take (No.)	Authorized Level A Take (No.)	Stock abundance estimate	Percentage of Stock Affected
North Atlantic right whale (<i>Eubalaena glacialis</i>)	105	0	440	23.86
Fin Whale (<i>Balaenoptera physalus</i>)	73	0	1,618	4.51
Sei whale (<i>Balaenoptera borealis</i>)	3	0	357	0.84
Humpback whale (<i>Megaptera novaeangliae</i>)	53	0	823	6.43
Minke whale	16	0	2,591	0.62

<i>(Balaenoptera acutorostrata)</i>				
Sperm whale (<i>Physeter macrocephalus</i>)	3	0	2,288	0.13
False killer whale (<i>Pseudorca crassidens</i>)	3	0	442	0.68
Cuvier's beaked whale (<i>Ziphius cavirostris</i>)	6	0	6,532	0.09
Long-finned pilot whale (<i>Globicephala melas</i>)	53	0	5,636	0.94
Atlantic white-sided dolphin (<i>Lagenorhynchus acutus</i>)	513	0	48,819	1.05
White-beaked dolphin (<i>Lagenorhynchus albirostris</i>)	3	0	2,003	0.15
Short beaked common Dolphin (<i>Delphinus delphis</i>)	1,433	0	70,184	2.04
Atlantic spotted dolphin (<i>Stenella frontalis</i>)	2	0	44,715	0.0045
Striped dolphin (<i>Stenella coruleoalba</i>)	1	0	54,807	0.0018
Bottlenose Dolphin (<i>Tursiops truncatus</i>)	411	0	77,532	0.53
Harbor Porpoise (<i>Phocoena phocoena</i>)	1188	0	79,883	1.48
Harbor Seal ¹ (<i>Phoca vitulina</i>)	11,137	0	75,834	14.68
Gray seal (<i>Halichoerus grypus</i>)	1293	0	505,000	0.25

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. § 1531 *et seq.*) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally, in this case with the Greater Atlantic

Regional Fisheries Office (GARFO) Protected Resources Division, whenever we propose to authorize take for endangered or threatened species.

NMFS is proposing to authorize take of three listed species, which are listed under the ESA: fin, humpback, and North Atlantic right whale. Under section 7 of the ESA, BOEM consulted with NMFS on commercial wind lease issuance and site assessment activities on the Atlantic Outer Continental Shelf in Massachusetts, Rhode Island, New York and New Jersey Wind Energy Areas. NOAA's GARFO issued a Biological Opinion concluding that these activities may adversely affect but are not likely to jeopardize the continued existence of fin whale, humpback whale, or North Atlantic right whale. The Biological Opinion can be found online at http://www.nmfs.noaa.gov/pr/permits/incidental/energy_other.htm. NMFS is also consulting internally on the issuance of an IHA under section 101(a)(5)(D) of the MMPA for this activity. Following issuance of the DWW's IHA, the Biological Opinion may be amended to include an incidental take exemption for these marine mammal species, as appropriate.

National Environmental Policy Act (NEPA)

NMFS prepared an Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA). A Finding of No Significant Impact (FONSI) was signed in June 2017. A copy of the EA and FONSI are posted at

http://www.nmfs.noaa.gov/pr/permits/incidental/energy_other.htm.

Authorization

NMFS has issued an IHA to Deepwater Wind for the potential harassment of small numbers of 18 marine mammal species incidental to high-resolution geophysical (HRG) and

geotechnical survey investigations associated with marine site characterization activities off the coast of New York in the Project Area, provided the previously mentioned mitigation, monitoring and reporting.

Dated: July 10, 2017.

Donna S. Wieting,

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National Marine Fisheries Service.

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